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Mr. Paul A. Rakowski, P.E., DEE  
Head, Environmental Program Branch  
Environmental Division,  
Atlantic Division (LANTDIV), Code 182  
Naval Facilities Engineering Command  
1510 Gilbert Street  
Norfolk, VA 23511-2699

Re: Naval Station Roosevelt Roads - EPA ID # PR2170027203  
EPA Comments on draft RFI report for SWMU #9 dated March 6, 1998

Dear Mr. Rakowski:

The United States Environmental Protection Agency (EPA) Region 2 has completed its review of the two volume draft RFI report for SWMU #9 (the Report), transmitted on behalf of the Navy by Baker Environmental, Inc.'s (your contractor's) letter of March 9, 1998. SWMU #9 is comprised of six large underground fuel storage tanks, located in three geographically separated areas, which have been designated A, B, and C, as follows:

Area A: Tanks 212 and 213  
Area B: Tanks 214 and 215  
Area C: Tanks 216 and 217.

Contaminant impacts on the three areas vary, due to their geographic separation from one another. Areas A and B are relatively close to one another. Area C is quite isolated from Areas A and B, and the RFI investigations have not included those areas (consisting largely of mangrove wetlands) between the A and B locale and Area C. The Report gives separate recommendations for each Area, and EPA concurs that final decisions for each can be made separately.

However, as discussed in the enclosed May 21, 1998 Evaluation prepared by EPA's contractor, TechLaw, Inc, there are significant data gaps in site characterization, inadequate evaluation of environmental impacts, and inadequate documentation of future restricted site usage and non-usability of groundwater. For these reasons, EPA does approve the Report as submitted, or, at this time, the no further action recommendations made for any of the three areas (Areas A, B, & C) constituting SWMU #9. Some of EPA's most significant concerns are discussed below.

#### I. Benzene/Toluene Plume Delineation

Benzene was detected in the groundwater at well 9MW-02R (sample 9GW02R), located approximately midway between areas A and B, at a concentration of 4,900 ug/l, and toluene at a concentration of 4100 ug/l. The benzene concentration is almost three orders of magnitude above the maximum contaminant level (MCL) for benzene of 5 ug/l, pursuant to 40 CFR § 141.60. The toluene concentration exceeds its respective MCL of 1000 ug/l by a factor of 4. Although MCLs are drinking water standards, they are also accepted as "action levels" (standards upon which to require further investigation) for RCRA corrective action investigations, though are not necessarily used for setting clean-up levels. In fact the usage of MCLs for action levels is discussed in the 1994 Final RCRA permit for Roosevelt Roads.

The benzene and toluene plume(s) penetrated by well 9MW-02R cannot be considered adequately delineated. No benzene or toluene plume (isopleth) map(s) has been submitted, and there is not adequate information to construct such contours, due to the wide spacing of wells, the insufficient definition of groundwater flow directions in the area (see discussion below regarding groundwater elevation data from Phase II wells), and the absence of any wells directly north or east of that location (9MW-02R). Also, the source for the benzene and toluene seen in well 9MW-02R is not defined, since the well is not in immediate proximity to any of the fuel storage tanks.

Soil and groundwater analytical data points have been established approximately midway between Areas A and B, at wells 9MW-02R and 9MW-02N, during the Phase II investigations for this SWMU implemented in September 1997. However, groundwater elevation data from these two key wells (and also well 9MW-02S) is not listed in the Report or on the submitted well logs, or incorporated into the groundwater elevation/gradient maps included with the Report (even though water table points are shown on Figure 4-3, a "Hydrogeologic Cross-Section", the exact elevations are not listed). As a result, EPA cannot determine:

- 1) if the wells are screened across the water table as required [It should be noted that well 9MW-02R, which EPA required to be installed as a replacement to 9MW-02 since that well screen did not straddle the water table, had a petroleum odor described on its well log from 8 feet to 17 feet below surface, and elevated PID readings from 8 feet to the total depth of 22 feet (refer to Appendix C of the Report)], or

- 2) the hydraulic relationship of well 9MW-02R to the Area A and B tanks, and
- 3) without groundwater elevation and gradient data from the Phase II wells incorporated into the Report, it is difficult to assess the likely configuration of the benzene/toluene plume penetrated by well 9W-02R.

Therefore, EPA requests the Navy to submit groundwater elevation data from all Phase II (1997) wells, and submit a groundwater elevation/gradient map reflecting groundwater elevations from the Phase II (1997) wells 9MW-02R, -02N, and -02S. Also, EPA requires a more complete delineation of the benzene/toluene plume(s), before a no further action recommendation can be approved.

## II. Evaluation of Potential Human Health Risks

In regards to possible potential risk(s) to human health from consumption of groundwater impacted by this SWMU, as discussed in the enclosed TechLaw comments, calculating the reasonable maximum exposure (RME) concentration for benzene at the 95th. percent upper confidence limit of the arithmetic mean of the measured concentrations, results in a benzene groundwater RME for this SWMU of 878 ug/liter. Utilizing that concentration in calculating potential risk, results in unacceptable risk being indicated for both adults and children ( $2.4 \times 10^{-4}$  and  $1.4 \times 10^{-4}$  respectively) from possible future consumption of groundwater.

Potential risks may have to be reevaluated (recalculated) based on the more fully delineated plume. In addition, due to the relatively high benzene and toluene concentrations in the groundwater, some follow-up groundwater monitoring may be warranted to document that the contaminant concentrations are not increasing; however, the final decision on that should await more complete delineation of the benzene/toluene plume.

Also, even though groundwater at this site is not currently used as a drinking water source, following complete plume delineation, EPA would require documentation of the non-potability (salinity data, etc), non-useability (yield information/calculations) of the impacted groundwater, if a no further action recommendation is made based on such a condition (non-usage of groundwater). In addition, EPA would require documentation (such as certification by the base's commanding officer, or some other enforceable document) of restricted future usage for the site of this SWMU, if the no further action recommendation is based on restricted site usage.

## III. Evaluation of Possible Environmental Impacts

Also, in order for EPA to approve a no further action determination, besides no unacceptable human health risks being indicated, no unacceptable impacts to the environment must be indicated. An Environmental Risk Assessment (ERA) was not conducted for this SWMU, even though it is located directly adjacent to wetlands connected to surface water bodies. Therefore, in order to demonstrate that this SWMU poses no unacceptable risks to the environment, an ERA

evaluation needs to be conducted. The evaluation should determine whether ecological receptors may be exposed to site-related contaminants by describing conditions at the site, potential receptors, and potential exposure pathways. If exposure pathways are present, then the risk to ecological receptors needs to be characterized in accordance with the following guidance:

- Framework for Ecological Risk Assessment. 1992. Risk Assessment Forum, U.S. Environmental Protection Agency. EPA/630/R-92/001; and,
- Proposed Guidelines for Ecological Risk Assessment. Risk Assessment Forum, U.S. Environmental Protection Agency. EPA/630/R-95/002B.

#### Conclusions/Requirements

Within 50 days of your receipt of this letter, please submit a written response to the above comments (including a groundwater elevation/gradient map incorporating Phase II wells), and all comments and recommendations given in Sections 3.0, 4.0, 5.0 and 6.0 of the enclosed TechLaw evaluation. However, the Navy does not need to address comment #1 in Section 3.0 of TechLaw's review, since EPA's Division of Environmental Science and Assessment (DESA) in Edison, New Jersey will review the quality of the analytical data, and copies of the analytical data packages (including QA/QC information) have been provided to Mr. Leon Lazarus of DESA, via Baker Environmental's transmittal letter of March 27, 1998.

Also, as discussed previously, please submit within 50 days of your receipt of this letter:

- 1) a work plan to fully delineate the benzene/toluene plume(s) encountered in well 9MW-02R, and to address any other data gaps noted in the attached TechLaw comments, and
- 2) either an environmental risk assessment, or a work plan to complete one.

In addition, prior to any approval of a no further action determination for this SWMU, please submit documentation that Tanks 212, 213, 214, 215, 216, and 217 are in compliance with the applicable requirements of 40 CFR § 280.

Please telephone Mr. Tim Gordon of my staff at (212) 637-4167 if you have any questions regarding any of the above.

Sincerely yours,



Nicoletta Di Forte  
Chief, Caribbean Section  
RCRA Programs Branch

Enclosure: TechLaw comments of May 21, 1998

cc: Mr. Israel Torres, PREQB, with encl.  
Ms. Madeline Rivera, NAVSTA Roosevelt Roads, with encl.  
Mr. Christopher Penny, LANTDIV, with encl.  
Mr. Tom Fuller, Baker Environmental, with encl.  
Ms. Luz Muriel-Diaz, PREQB, with encl.  
Mr. William Goold (for Adam Balough), TechLaw Inc., w/o encl.

SWMU 9 RCRA FACILITY INVESTIGATION REPORT  
NAVAL STATION ROOSEVELT ROADS  
CEIBA, PUERTO RICO

Submitted to:

Ms. Elizabeth Van Rabenswaay  
Regional Project Officer  
U. S. Environmental Protection Agency  
Region 2  
290 Broadway, 22nd Floor  
New York, New York 10007

Submitted by:

TechLaw, Inc.  
122 East 42nd Street  
Suite 2200  
New York, New York 10168

May 21, 1998

SWMU 9 RCRA FACILITY INVESTIGATION REPORT  
NAVAL STATION ROOSEVELT ROADS  
CEIBA, PUERTO RICO

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**SWMU 9 RCRA FACILITY INVESTIGATION REPORT  
NAVAL STATION ROOSEVELT ROADS  
CEIBA, PUERTO RICO**

## **1.0 INTRODUCTION**

The U.S. Environmental Protection Agency (EPA) has requested support for technical review of documents associated with the RCRA Facility Investigation (RFI) of the U.S. Naval Station Roosevelt Roads (NSRR) located in Ceiba, Puerto Rico. TechLaw has assigned this project to TRC, a TechLaw Team member under the REPA Contract under Work Assignment No. R02020.

The NSRR is located on the east coast of Puerto Rico in the municipality of Ceiba, approximately 33 miles southeast of San Juan. The primary mission of NSRR is to provide full support for the Atlantic Fleet weapons training and development activities. NSRR is currently operating under a Draft RCRA Corrective Action Permit that includes varying degrees of work at 28 Solid Waste Management Units (SWMUs) and three Areas of Concern (AOCs).

EPA requested the TechLaw Team to review the *Draft RCRA Facility Investigation Report for SWMU 9, Volumes 1 and 2*, dated March 6, 1998.

The TechLaw Team's report presents evaluations of the Draft RFI SWMU 9 Investigation Report. The method and objective of this evaluation are presented in Section 2.0. General comments are presented in Section 3.0. Page-Specific Comments are detailed in Section 4.0; Editorial Comments are detailed in Section 5.0; and, Recommendations are presented in Section 6.0.

## **2.0 METHODOLOGY**

Pursuant to the EPA Work Assignment Manager's (WAM's) Technical Directive dated March 9, 1998, the TechLaw Team reviewed the draft RFI SWMU 9 Investigation Report, in particular Sections 3.0, 4.0, 5.0, 6.0, and 7.0 with respect to the adequacy and acceptability of investigation activities and conclusions and analytical results. The following documents were considered during the review:

- Final RCRA Facility Investigation, NSRR, P.R. prepared by Baker Environmental, Inc., dated September 1995;
- Addendum 3 to the September 1995 RFI for Additional Investigations at SWMU 9, dated May 15, 1997;
- *Risk Assessment Guidance for Superfund (RAGS), Volume I: Human Health Evaluation Manual; (Part A)* Interim Final, 540/1/-89, December 1989; and, *Development of Risk-Based Preliminary Remediation Goals (Part B)* publication 9285.7-01B, December 1991, PB92-963333;



- *EPA Region III Risk-Based Concentration Table*, October 22, 1997;
- *Human Health Evaluation Manual, Supplemental Guidance: "Standard Default Exposure Factors"* OSWER Directive 928.6-03 (EPA, March 25, 1991);
- *Supplemental Guidance to RAGS: Calculating the Concentration Term*, (publication 9285.7-08I, June 22, 1992);
- *Dermal Exposure Assessment: Principles and Applications* (EPA 600/8-91/001B, January 1992);
- *Superfund Exposure Assessment Manual*. Office of Remedial Response. EPA, 1988. (EPA/540/1-88/001); and
- *Exposure Factors Handbook*. Office of Health and Environmental Assessment. EPA, 1989. (EPA/600/8-89/043).

In addition to ensuring the human health risk assessment complied with the methodology presented in EPA guidance, the TechLaw Team performed a quality control check on all associated tables and appendices. Ten percent of the detection frequency and range data presented in Tables 6-1 through 6-3 were compared to Section 5.0 tables and all listed industrial and residential RBCs were compared to the EPA Region III *Risk-Based Concentration Table*, dated October 22, 1997. All information presented in Tables 6-5 through 6-13 and appendices K, L, and M, was reviewed and all calculations checked.

### 3.0 GENERAL COMMENTS

The following is a list of general comments regarding the report.

1. The quality of the analytical data can not be confirmed by using the information contained in the report. The report does not present sufficient raw data to confirm the accuracy of the tabulated data presented in Appendices H & I. The tabulated results appear to be validated based on the data qualifiers presented in the tables, but this can not be verified without validation reports which were not included. A statement on the usability of the data presented in the RFI report can not be made without first verifying the quality and accuracy of the reported results. In order to review the accuracy and quality of the reported results, the following items must be included:
  - Copies of the analytical data packages, including tabulated results and all associated raw data, QA/QC information, standards information, laboratory notebooks, instrument printouts, and detailed example calculations which would enable the data reviewer to reproduce all results reported; and
  - Copies of the data validation reports to assess the data qualifier actions that were applied to the reported results.

2. In general, the human health risk assessment performed for SWMU 9 complied with EPA guidance, with a few minor exceptions which are discussed below under page-specific comments. However, the Navy's recommendation for no further action at the site needs further justification. Benzene concentrations in ground water were detected at levels significantly above the MCL (maximum concentration of 4,900 ug/l versus the MCL of 5 ug/l) and the USEPA Region III COC value (0.36 ug/l). In addition, the RME benzene concentration of 878 ug/l (which is the 95-percent upper confidence limit of the arithmetic mean concentration) resulted in estimated incremental lifetime cancer risks for ingestion of groundwater of  $2.4 \times 10^{-4}$  and  $1.4 \times 10^{-4}$  for adults and children, respectively. As a result, while future use of site ground water appears unlikely, the Navy must:
  - Provide data (salinity and aquifer yield) demonstrating that the aquifer is not a potable water source;
  - Provide for long term monitoring of the aquifer to ensure levels do not increase (increased levels may result in risks via other pathways such as migration through soil into indoor air spaces or ecological risks); and,
  - Implement deed restrictions on the site which will effectively prevent any development of the site for uses other than its current use, without further evaluation of risk to human health.
3. An Environmental Risk Assessment was not conducted. In order to demonstrate that no unacceptable risk to the environment exists, an evaluation needs to be conducted. The evaluation should determine whether ecological receptors may be exposed to site-related contaminants by describing conditions at the site, potential receptors, and potential exposure pathways. If exposure pathways are present, then the risk to ecological receptors needs to be characterized in accordance with the following guidance:
  - Framework for Ecological Risk Assessment. 1992. Risk Assessment Forum, U.S. Environmental Protection Agency. EPA/630/R-92/001; and,
  - Proposed Guidelines for Ecological Risk Assessment. Risk Assessment Forum, U.S. Environmental Protection Agency. EPA/630/R-95/002B.

#### 4.0 PAGE-SPECIFIC COMMENTS

##### Page 4-8, Section 4.4.2, Paragraph 5

Ground water flow direction for Area A must be documented as inferred, as there are insufficient downgradient data control points.

The hydraulic gradient presented for 13GW03 and 13GW02 does not appear to be accurate. Subsequently, the average hydraulic gradient presented for Area A does not appear to be accurate. The calculation must be rechecked and corrected.

Page 4-9, Section 4.4.2, Paragraph 3

Several incorrect parameters appear in the slug test plots provided in Appendix F. Specifically, the three rw inputs (rw = radius of the well, including the gravel pack) for 9-MW02N, 9-MW02S, and 9-MW02R are stated as 0.46 feet. The inputs should be 0.26 feet (6.25 inch outside diameter augers). Additionally, the rc input (rc = radius of well casing) for 9-MW02S is stated as 0.086 feet. The rc input for 9-MW02S should be 0.083 feet. The slug test data must be re-analyzed with the correct input parameters and the document updated accordingly.

Table 4-2 and Figure 4-5

Several inconsistencies in groundwater elevations were identified between Table 4-2 and Figure 4-5. Groundwater elevations for wells 13GW11 and 13GW09 in Table 4-2 are reported as 97.82 and 100.20 ft/msl, respectively, but are presented on Figure 4-5 as 95.08 and 101.40 ft/msl, respectively. Also, the groundwater elevation for well 13GW05 is presented on the contour map but not in Table 4-2. Table 4-2 and Figure 4-5 must be cross-checked for consistency and revised as appropriate.

Table 5-1 through 5-6

Background analytical results presented in Tables 5-1 through 5-6 could not be verified since analytical data sheets for background samples were not included in the analytical laboratory results provided in Appendix H. The analytical data sheets must be submitted as an addendum so the values can be reviewed.

Table 5-30, Page 1

For well 9GW02R, concentrations of Gasoline and Diesel Range Organics, Ethylbenzene, Toluene, and Xylene (total) are inconsistent with results reported in Appendix H. According to Appendix H, the results for 9GW02R were "NA". Data presented in Table 5-30 should be reviewed for consistency with Appendix H and the report revised as appropriate. Also, the Toluene result for 9GW02S should read 3U not 3, based on results presented in Appendix H.

Page 6-5, Section 6.1.2, Paragraph 1

Section 6.1.2 states that "...due to a lack of toxicity criteria, TPH was not evaluated in the selection of COPCs." This Section should also state that increased risk from exposure to detected concentrations of TPH is further evaluated in Section 6.5, Sources of Uncertainty.

Page 6-8, Section 6.1.2, Paragraph 1, Page 6-14, Section 6.2.3, Paragraph 2, and Page 6-18, Section 6.2.5.1, Paragraph 3

Total, rather than dissolved, inorganic results need to be quantitatively evaluated in the risk assessment. It is not appropriate to assume dissolved more closely approximates exposure conditions at the tap when the actual characteristics of a possible future water supply are unknown. The quantitative risk assessment must be revised to include total inorganic results.

Page 6-14, Section 6.2.3, Paragraph 1

A description of the access restrictions must be included. The description should demonstrate how access by recreational users/trespassers will be prevented.

Page 6-14, Section 6.2.3, Paragraph 2

Section 6.2.3 states that "... groundwater at NSRR is not being utilized as potable water due to poor quality and low yields;...". Data which demonstrates the poor quality and low yields of the aquifer must be provided to support this statement.

Page 6-14, Section 6.2.3, Paragraph 2

The discussion on exposure pathways needs to address potential for elevated levels of volatile organic compounds in groundwater to migrate from the groundwater, through the soil gas in the overlying unsaturated soil and into buildings through pores, cracks or openings in any building foundations located at the site. If a quantitative evaluation of this exposure pathway is deemed unnecessary, justification for this determination needs to be presented in this section on exposure pathways.

Page 6-22

The EPA's Human Health Evaluation Manual, Development of Risk-Based Preliminary Remediation Goals (Part B), dated December 1991, presents a PEF (particulate emission factor) based on standard default assumptions of  $4.63 \times 10^9$  m<sup>3</sup>/kg. This PEF differs slightly from the PEF utilized here of  $1.32 \times 10^9$  m<sup>3</sup>/kg. The derivation of the PEF utilized must be presented.

Page 6-23, Paragraph 2, and Appendix M, Table 11

The dermally absorbed dose for organic compounds needs to be estimated using the nonsteady-state approach presented in the EPA document entitled Dermal Exposure Assessment: Principles and Applications (EPA 600/8-91/001B and dated January 1992). The text on page 6-23 and Table 11 of Appendix M must be revised to reflect this guidance.

Tables 6-5, and 6-6, also in Appendix M, Tables 3 and 6

The guidance referenced for the exposure input parameters for inhalation of contaminated air states that "... 20 m<sup>3</sup> per 8-hour workday represents a reasonable upper-bound inhalation rate for the occupational setting". However, input parameters for respiration rate and exposure time, which result in an inhalation rate of 10 m<sup>3</sup> per 8-hour workday, were utilized in this risk assessment. The input parameters for respiration rate and exposure time must be changed to reflect an inhalation rate of 20 m<sup>3</sup> per 8-hour workday for current on-site workers and future construction workers.

Page 7-1, Section 7.2.1, Paragraph 4

The conclusion must state that organic contamination is present in ground water at Area A above MCLs. Additionally, the conclusion must discuss that the extent of organic and inorganic contamination in on-site soil has been delineated only using industrial screening criteria exceedances, and not residential criteria.

Page 7-1, Section 7.2.1, Paragraph 3

The source of elevated levels of organic and inorganic contamination identified in soil and ground water at 9MW02 has not been determined. The extent of contamination in this area is unknown. The conclusions must include the fact that the contaminants identified along Manila Bay Street are anomalous to Area A site conditions and the conceptual site model utilized for the

RFI, and that further investigation near 9MW02 is warranted.

Page 7-2, Section 7.2.2, Paragraph 2

The conclusion for Area B must include the fact that the extent of organic contamination in ground water has not been delineated on-site. The conclusions must state that the extent of inorganic contamination in soil has not been delineated to the extent those residential screening criteria are exceeded.

Page 7-2, Section 7.2.3, Paragraph 1

The conclusion for Area C must include the fact that the extent of inorganic contamination in on-site soil is above background conditions. Additionally, the conclusion must state that organic contamination has been identified in ground water on-site at levels above MCLs, and the extent of ground water contamination has not been delineated.

Page 7-3, Section 7.3.1

Additional investigation at Area A must be completed to delineate the extent of organic and inorganic contamination in on-site soil and ground water. Of specific note, the RFI must include the extent of contamination in the area of the anomalous contaminant detections in soil and ground water at 9MW02, and the extent of organic ground water contamination in the area of the Disposal Pit. A recommendation of No Further Action for the site must be removed.

Page 7-3, Section 7.3.1, Paragraph 3

Additional information required to justify the "no further action recommendation", includes the following: 1) provide data (salinity and aquifer yield) demonstrating that the aquifer is not a potable water source, 2) provide for long term monitoring of the aquifer to ensure levels do not increase (increased levels may result in risks via other pathways such as migration through soil into indoor air spaces or ecological risks), and 3) implement deed restrictions on the site which will effectively prevent any development of the site for uses other than its current use, without further evaluation of risk to human health.

Page 7-3, Section 7.3.2

The recommendation for Area B must include additional ground water monitoring well installation, sampling, and analysis to delineate the extent of organic contamination. Surface and subsurface soils must be characterized at the location of the disposal pit. The recommendation for no further action at the site is not appropriate until the extent of contamination has been determined.

Page 7-3, Section 7.3.3

The recommendation for Area C must include additional sampling and analysis of ground water to delineate the extent of ground water contamination, which is above MCLs. A hypothesis must be developed for the source of organic contamination identified in on-site ground water, and utilize this information to refine the conceptual site model and the sampling plan, as needed. The recommendation for no further action is not appropriate until the extent and source of contamination has been determined.

Appendix M, Table 10 and Table 12

The document must include the target organ and toxic effect for each noncarcinogenic COPC evaluated in these tables because the total HI is greater than 1.

## **5.0 EDITORIAL COMMENTS**

### Page 4-9, Section 4.4.2, Paragraph 1

The hydraulic gradient between 13GW06 and 13GW05 should be included in this discussion.

### Table 5-31, 32, 35, and 36

The tables of analytical results should be consistent with the analytical results from Appendix H. The J values are missing throughout these tables.

### Figures 5-8

Sample ID's should be consistent with the sample ID's presented in Appendix H. Sample ID's 9MW02R and 9MW02S should be corrected to "9GW02R" and "9GW02S". The J values for the analytical results on the figure are inconsistent with the analytical results from Appendix H.

### Figures 5-9

Sample ID 9W02N-05 should be corrected to "9MW02N-05."

## **6.0 RECOMMENDATIONS**

The following actions are recommended.

- A complete analytical data package and validation report must be included in the RFI report.
- Once the extent of ground water contamination has been adequately delineated, four quarterly rounds of ground water sampling and analysis at SWMU 9 must be completed to confirm no increasing trends in site contaminant levels. This must be completed prior to recommending no further action for SWMU 9.
- Additional soil sampling and analysis must be completed at Area 9 to support the conclusion that the inorganic contaminants present are a result of "leaching of volcanically derived soils." Current background data does not support this conclusion, as the elevated levels are above the documented background levels. Additional background soil samples should be collected from NSRR locations with a surficial geology of similar provenance to that of SWMU 9 sampling areas and no historical impact from site activities.
- Prior to recommending no further action at Tanks 214, 215, 216, and 217, compliance with Subpart G of 40 CFR 280 must be demonstrated.